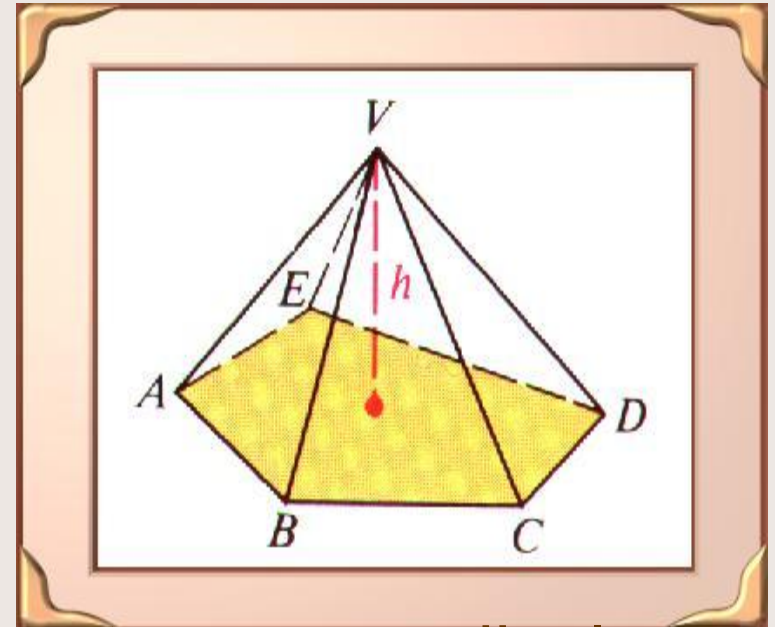
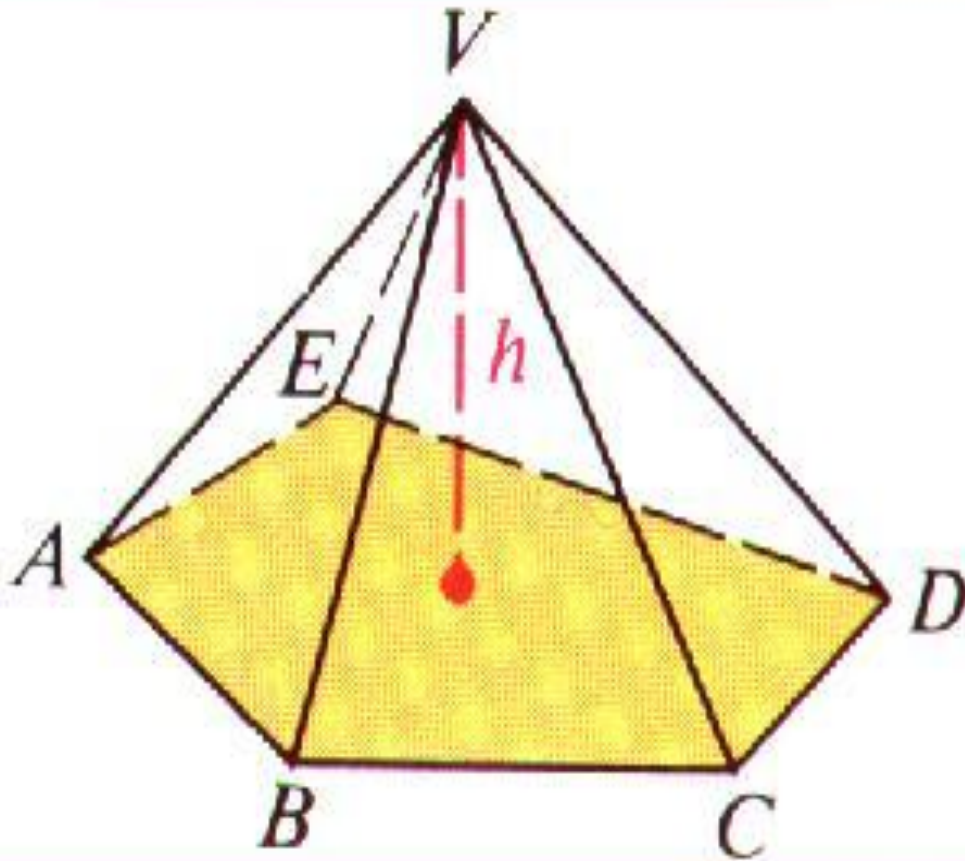


Pyramids



- The diagram shows the **pentagonal pyramid** $V-ABCDE$. Point V is the **vertex** of the pyramid and pentagon $ABCDE$ is the **base**.
- The segment from the vertex perpendicular to the base is the **altitude** and its length is the **height, h** , of the pyramid.

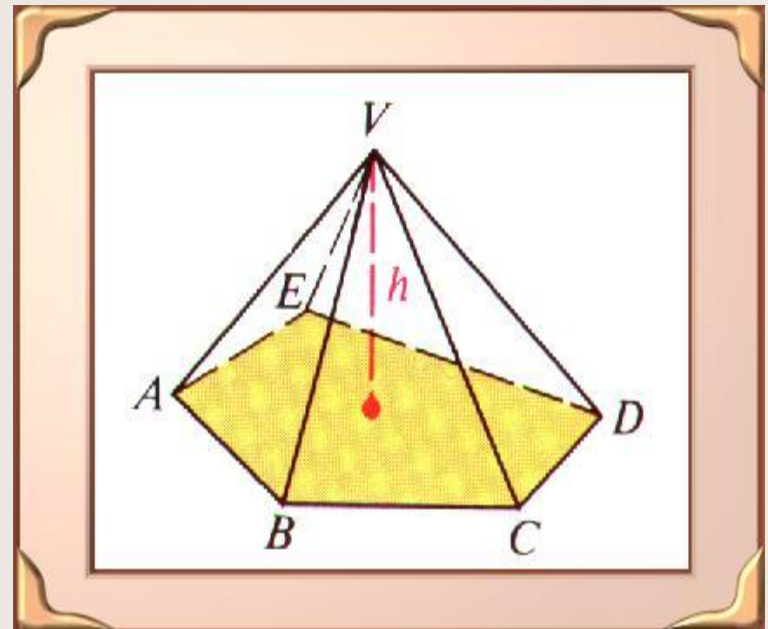




Pyramids



- The five triangular faces with V in common, such as $\triangle VAB$, are **lateral faces**. These faces intersect in segments called **lateral edges**.
- The height of a lateral face is called the **slant height**, l of the pyramid.

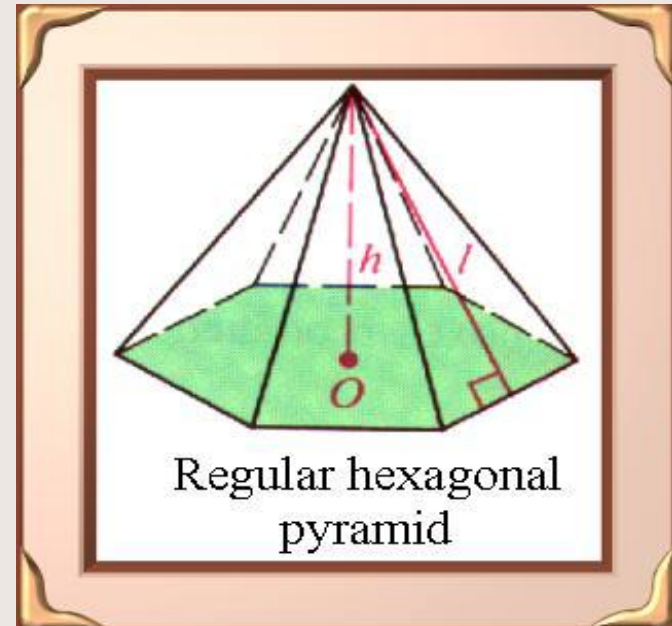


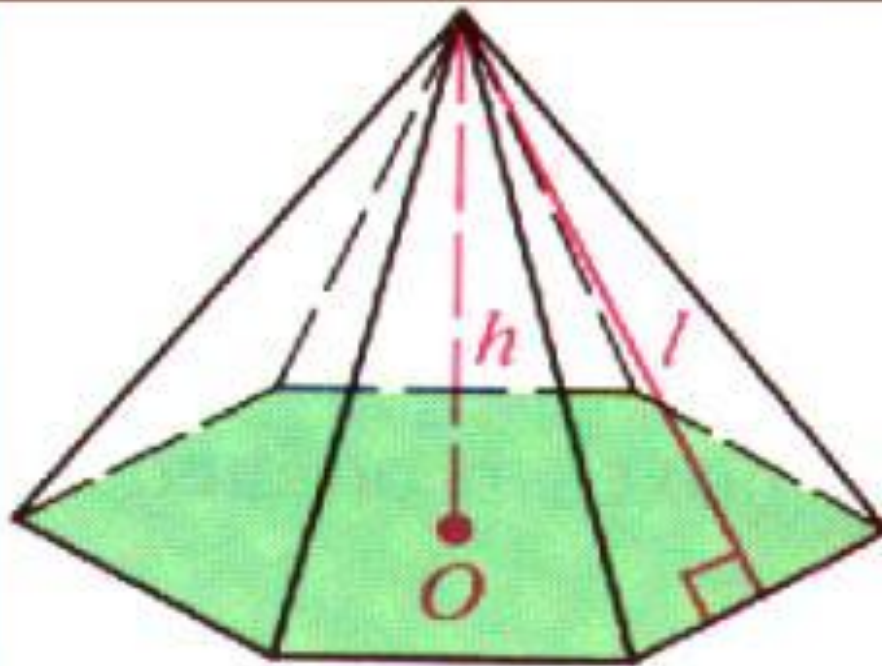
Most of the pyramids you'll study will be **regular pyramids**.



These are pyramids with the following properties:

- The base is a regular polygon
- All lateral edges are congruent
- All lateral faces are congruent isosceles triangles.
- The altitude meets the base at its center, O .





Regular hexagonal
pyramid

Example 1

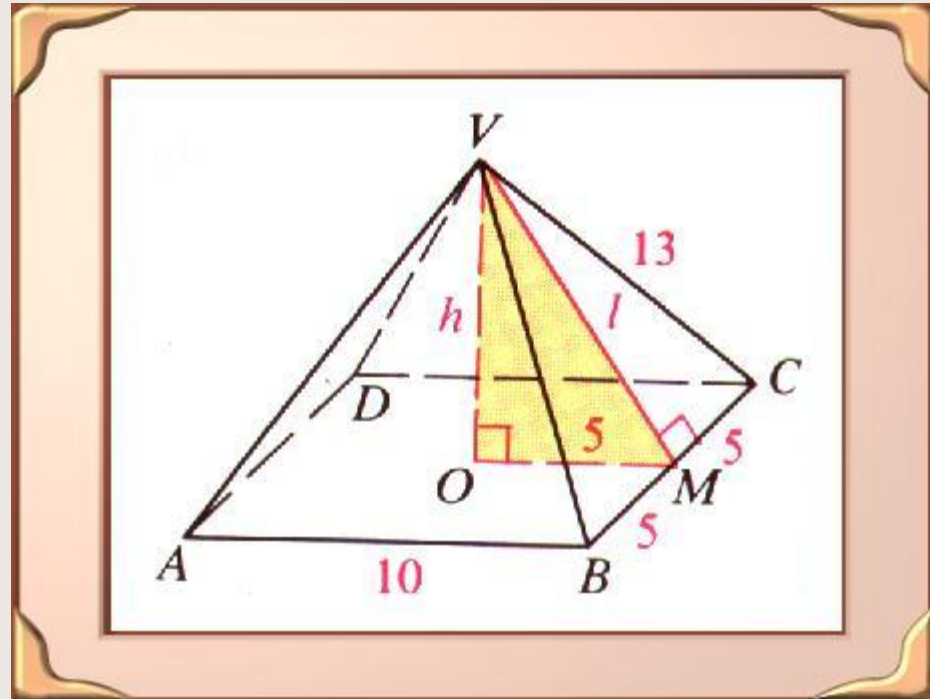


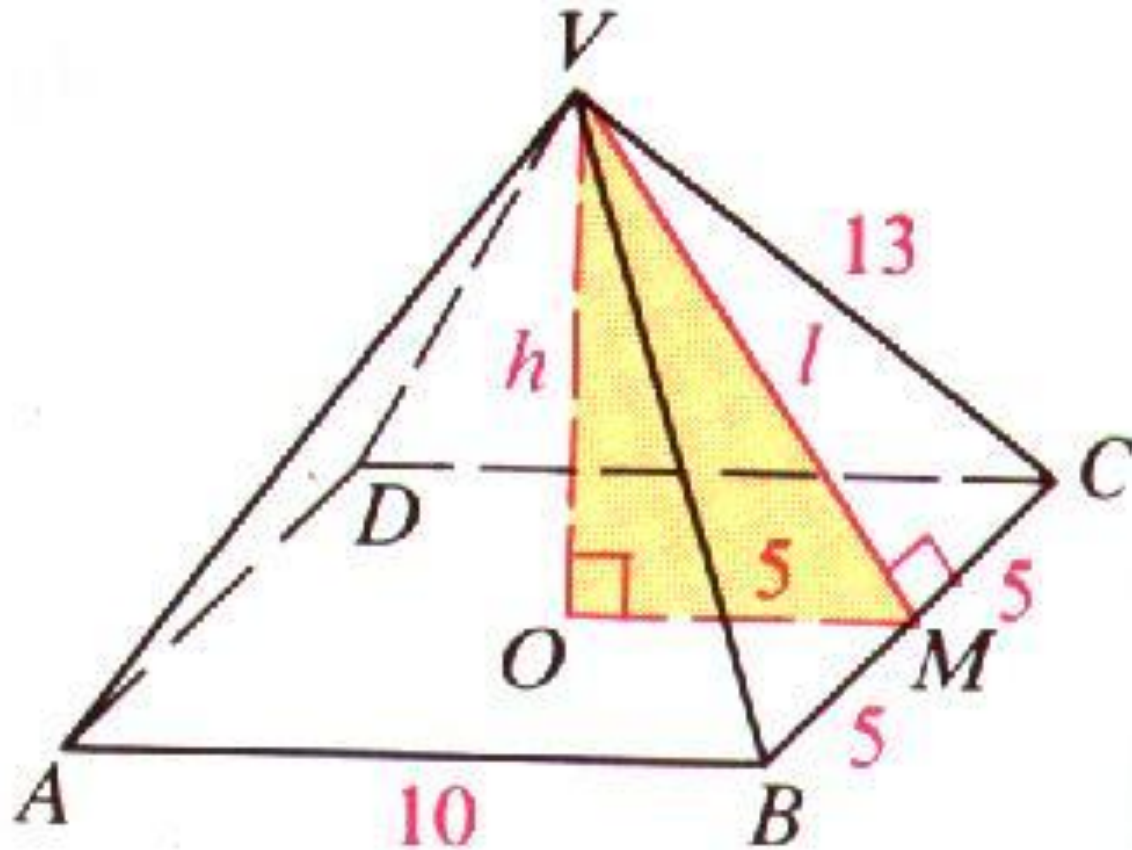
A regular square pyramid has base edges 10 and lateral edges 13.

Find its

(a) slant height

(b) height.

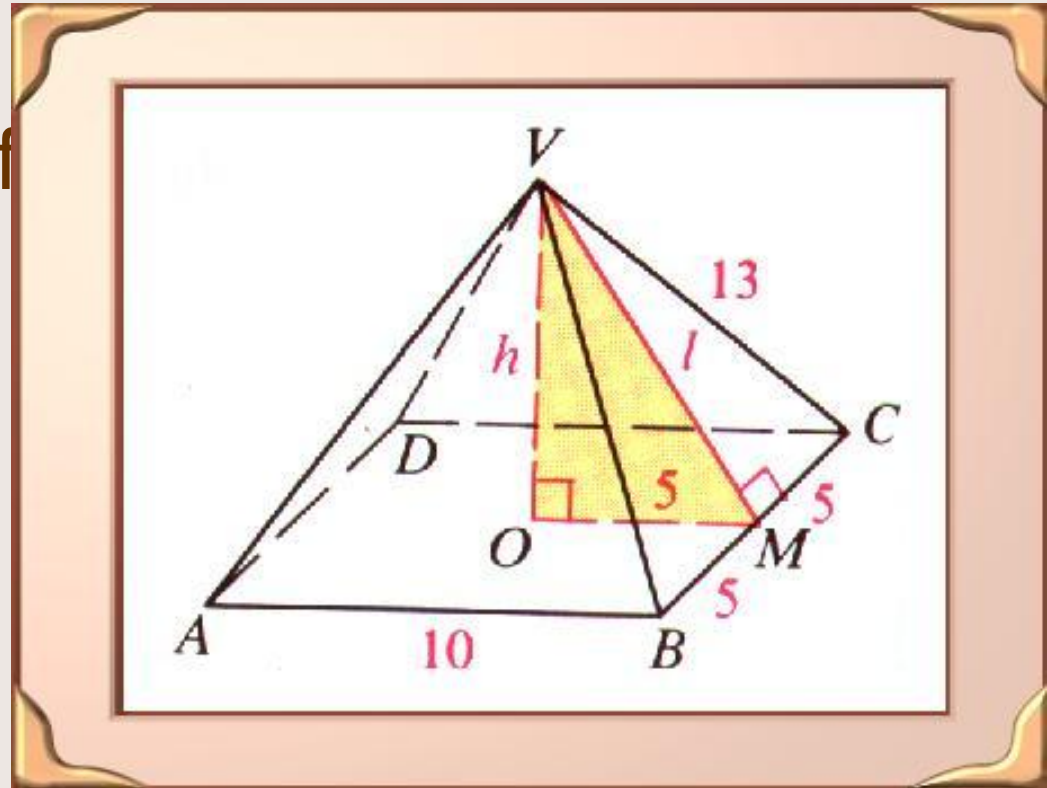




Example 2



Find the lateral area of the pyramid given in Example 1.

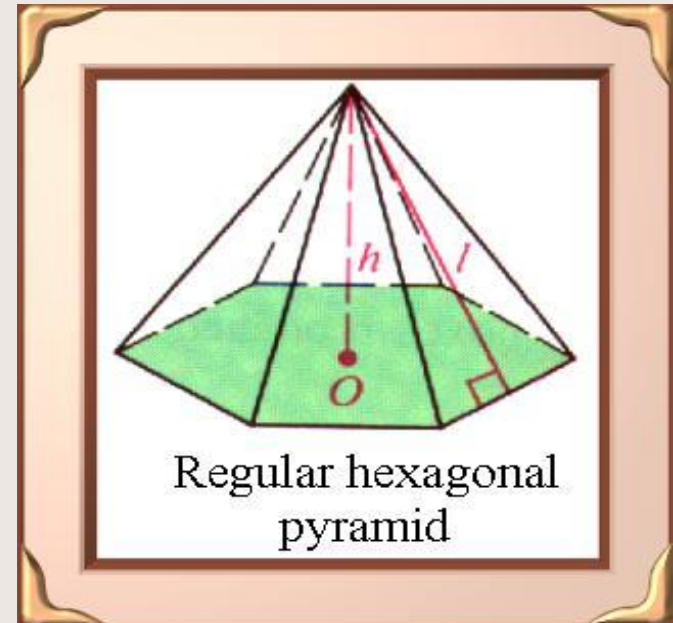


The Lateral Area of a Regular Pyramid

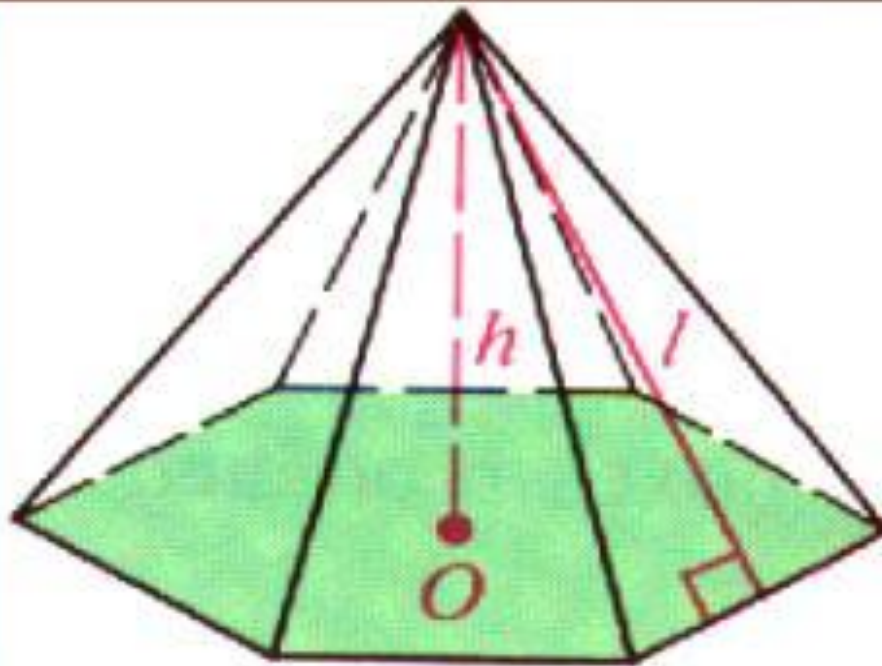


The lateral area of a regular pyramid with n lateral faces is

(the area of one lateral face $\times n$)



Regular hexagonal pyramid



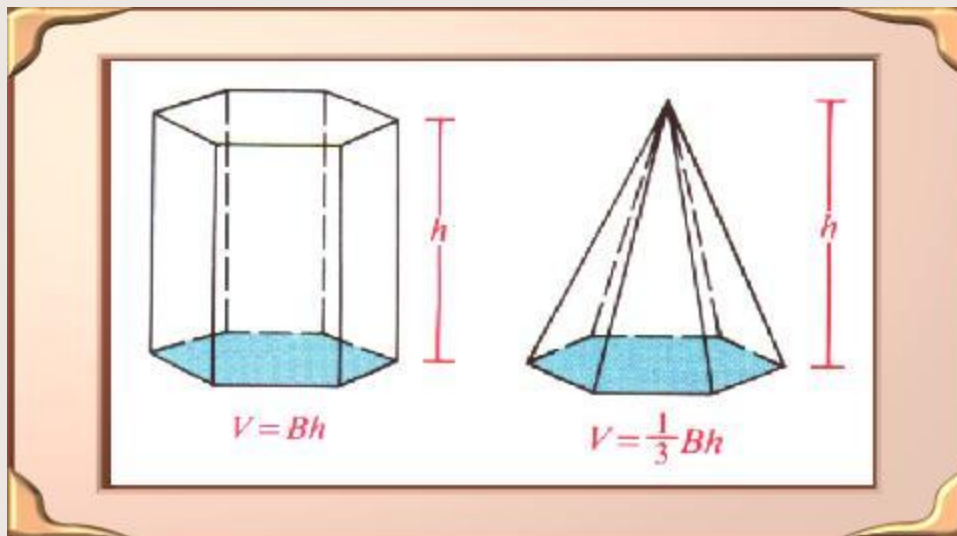
Regular hexagonal
pyramid

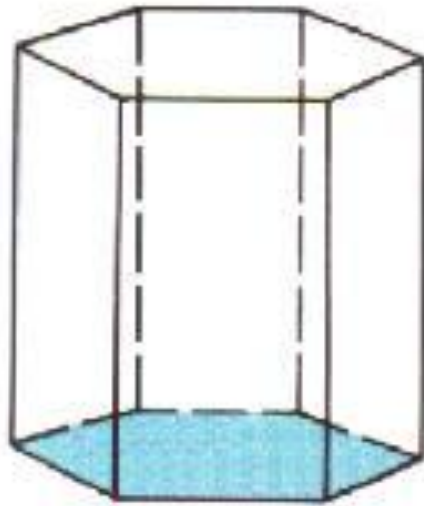
The Volume of a Pyramid



The prism and pyramid below have congruent bases and equal heights. Since the volume of the prism is Bh , the volume of the pyramid must be less than Bh . In fact, it is exactly

$$\frac{1}{3}BH.$$





$$V = Bh$$



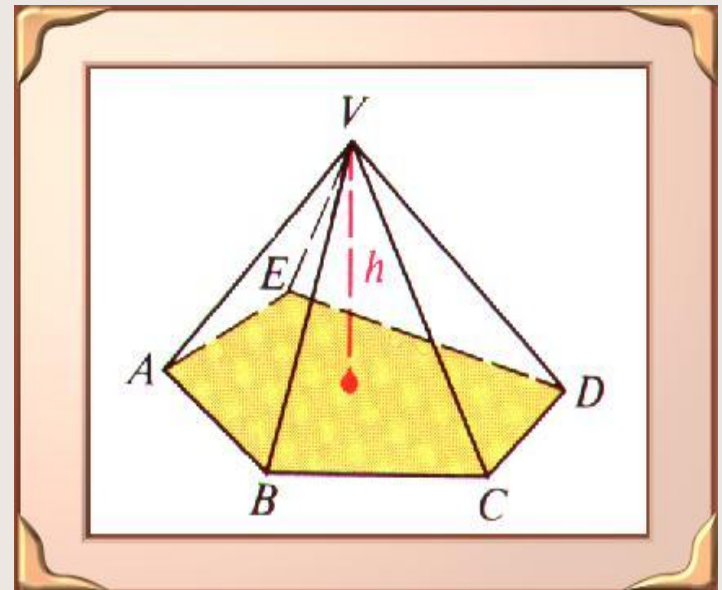
$$V = \frac{1}{3} Bh$$

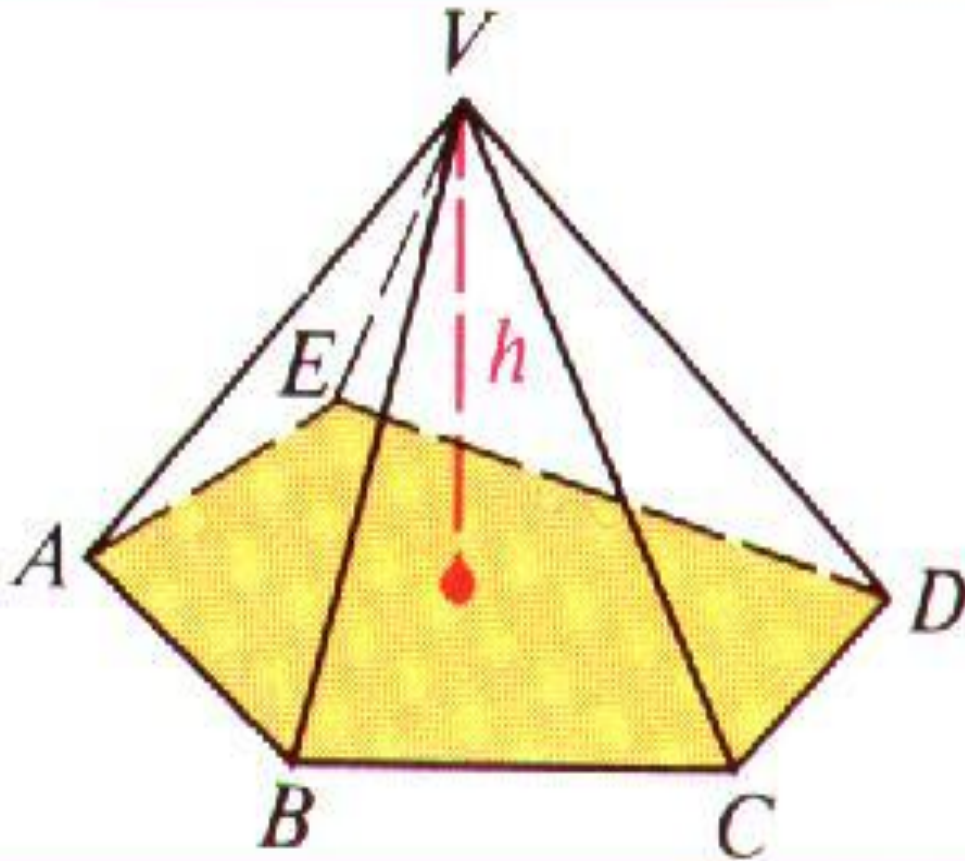
The Volume of a Pyramid



The volume of a pyramid equals *one third the area of the base times the height of the pyramid.*

$$V = \frac{1}{3} BH$$

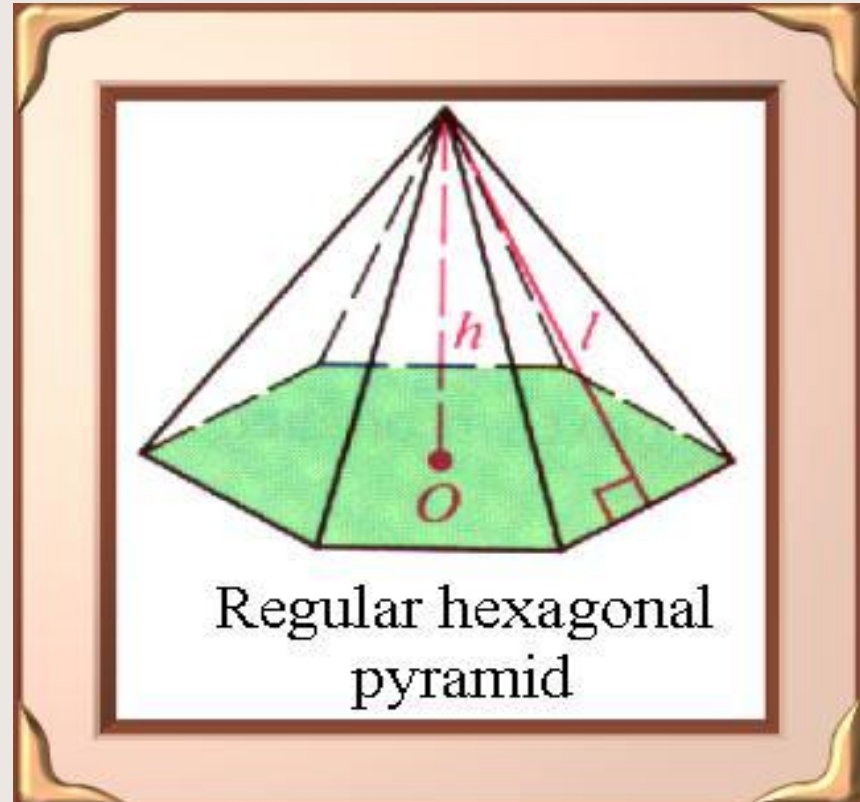




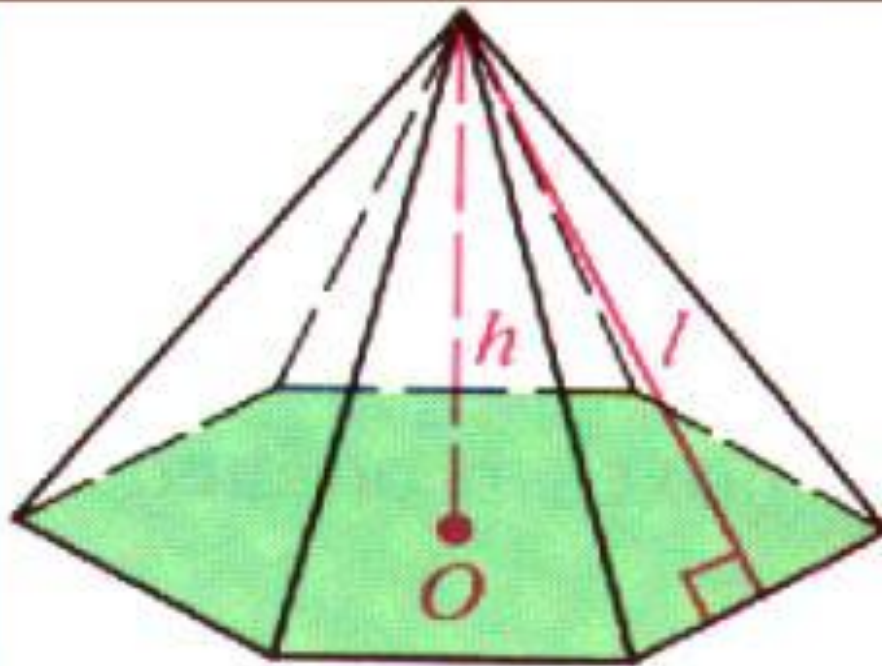
Example 3



Suppose the regular hexagonal pyramid shown has base edges 6 and height 12. Find its volume.



Regular hexagonal pyramid



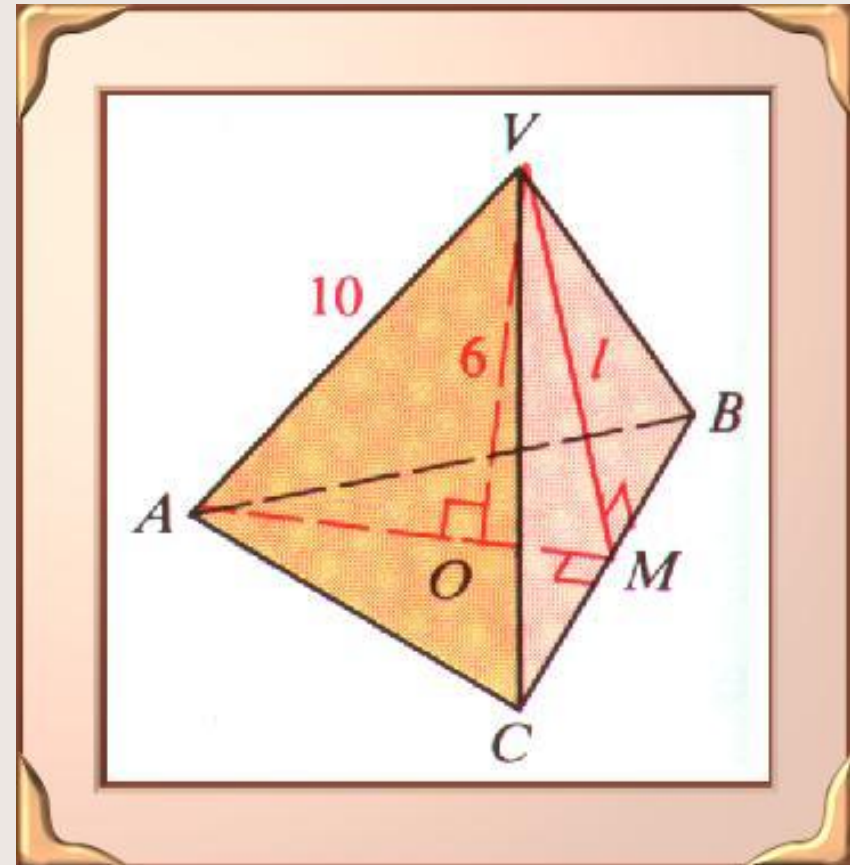
Regular hexagonal
pyramid

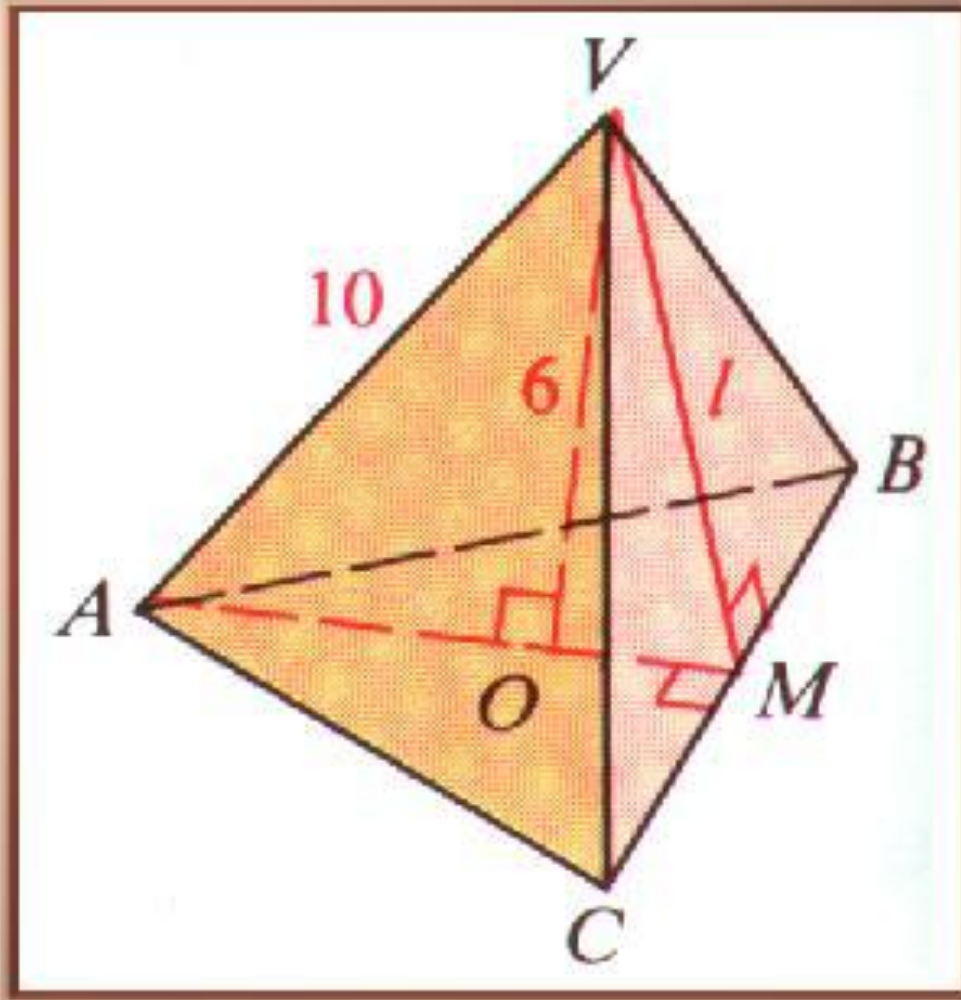
Example 4



A regular triangular pyramid has lateral edge 10 and height 6. Find the

- (a) lateral area
- (b) volume.

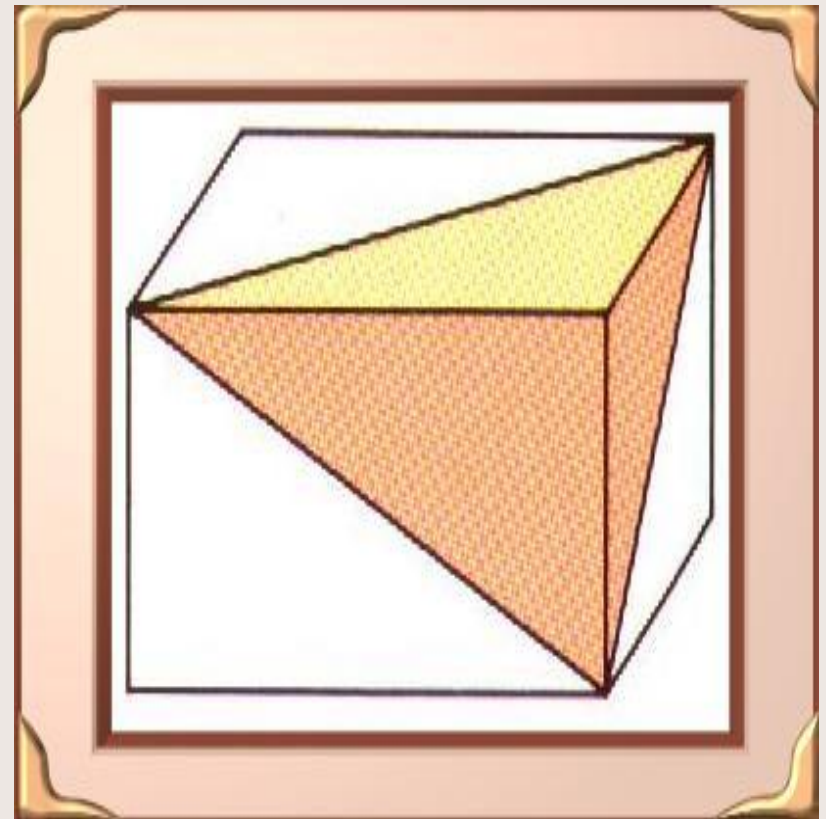


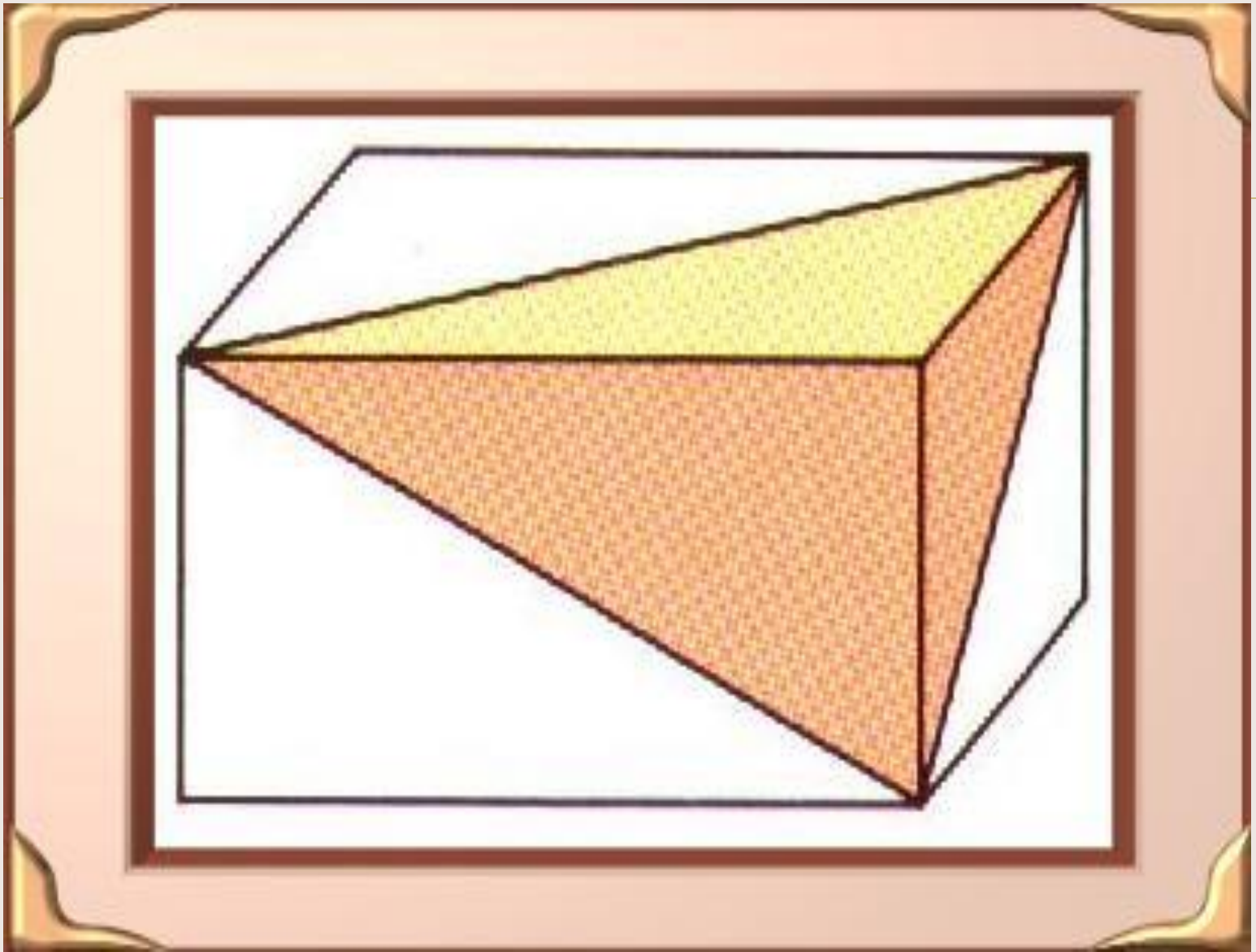


Example 5



The shaded pyramid in the diagram is cut from a rectangular solid. How does the volume of the pyramid compare with the volume of the rectangular solid?





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